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ABSTRACT

High school is an important time in an adolescent's life, during which the influence of peers can be both positive and negative. Using data from a national longitudinal study, high school students' peer groups and the relationship between the values of peer groups with whom students associated in high school and a broad range of educational outcomes measured during and after high school are examined and presented in this report. Emphasis was placed on exploring the values of peer groups, such as the importance of school learning and achievement, the importance of social activities, and the importance of engaging in delinquent activities. The major findings that emerged indicate that those students whose friends cared about learning had better educational outcomes than students whose friends showed little interest in learning. Likewise, students with friends who were interested in having sex, drinking, and using drugs experienced less desirable educational outcomes. The kinds of friends that students made in high school differed according to a student's gender, social class, race-ethnicity, and academic background, but there did not appear to be a relationship between the extent to which students chose friends who valued social activities and their educational outcomes. Other results are reported. (RJM)

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Statistics in Brief **June 1997**

Students' Peer Groups in High School:
The Pattern and Relationship to Educational Outcomes[1]

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High school is an important period of time in an adolescent's life. It is at this time that students are making decisions about their course taking and future educational and career plans. It is also the time when parental authority is being challenged by peer pressure.[2] The influence of peers can be both positive and negative. On the positive side, it can serve as an important incentive for adolescents to perform well in school. On the negative side, peer influence can lead to discipline problems and delinquent behaviors both inside and outside school. Thus, the values of peers can play an important role in students' educational experiences and outcomes.

Using data from a national longitudinal study, this report examined high school students' peer groups and explored the relationship between the values of peer groups with whom students associated in high school and a broad range of educational outcomes measured during and after high school. For this analysis, the following values of peer groups[3] were examined:

- importance of school learning and achievement—the extent to which a student's friends care about learning in school;
- importance of social activities—the extent to which a student's friends value the social aspects of adolescent life; and
- importance of engaging in delinquent activities—the extent to which a student's friends are interested in pursuing such activities as using drugs, having sex, or drinking (These items were only asked in the 12th grade in 1992 and not in the 10th grade in 1990).

The major findings of this study include:

- Compared with students with friends who showed little interest in learning, those with friends who cared about learning had better educational outcomes—they were less likely to drop out of school and more likely to be enrolled in an academic program, graduate from high school, and continue their education after graduating.

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- On the other hand, students with friends who were interested in having sex, drinking, and using drugs experienced less desirable educational outcomes. These students experienced a higher rate of dropping out of school and a lower rate of being enrolled in academic programs, graduating from high school, and pursuing postsecondary education.

- The kinds of friends (as described by their values) that students made in high school differed according to a student's gender, social class, race–ethnicity, and academic background. Compared with their male, low socioeconomic (SES), or academically weak counterparts, students who were female, from high SES families, or with strong academic backgrounds, were more likely to have friends who cared about school learning and were less likely to associate with peers who were interested in engaging in delinquent activities.

- In the 10th grade, black or Asian/Pacific Islander students were more likely than white students to have peers who cared about learning.

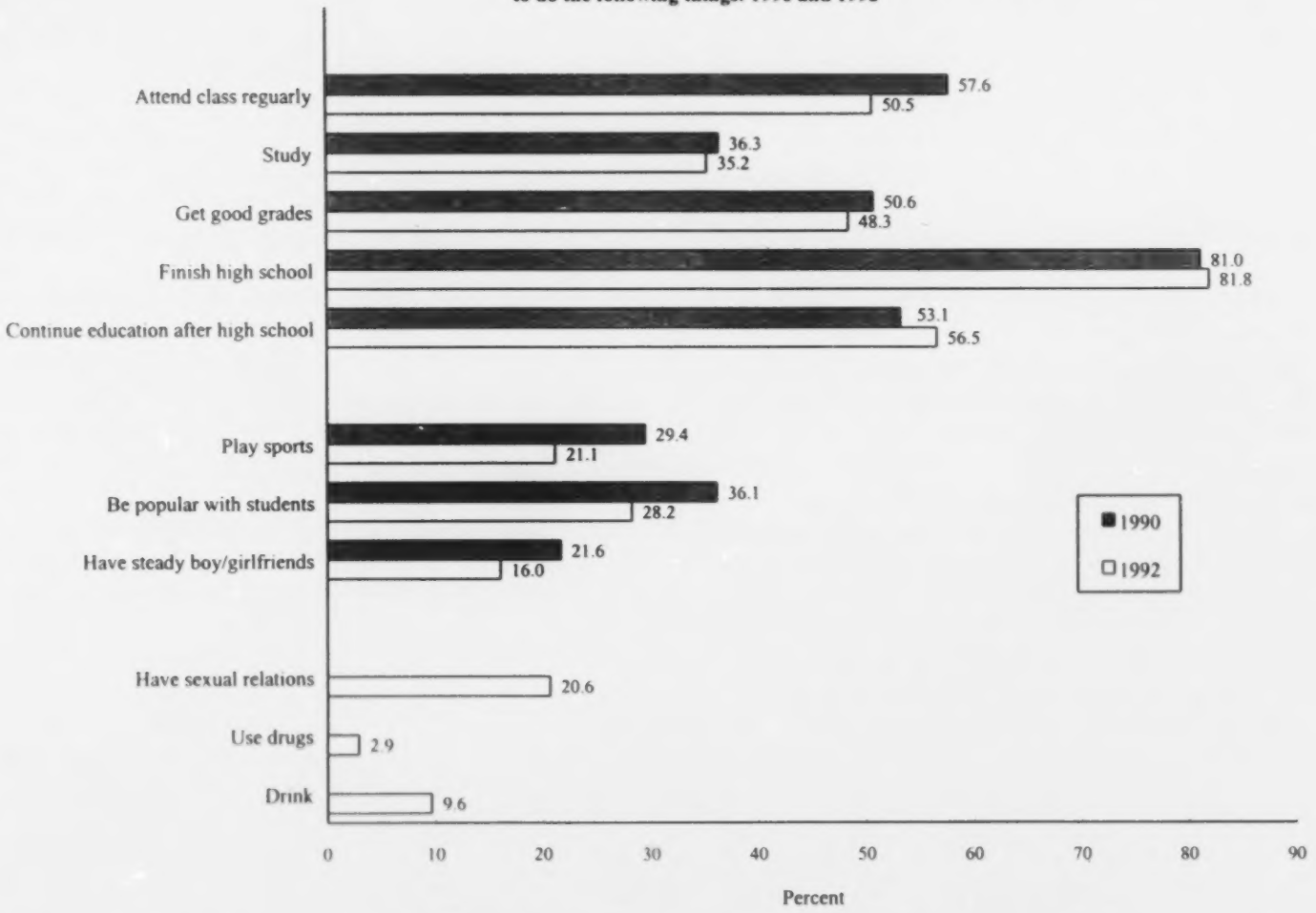
- There did not appear to be a relationship between the extent to which students chose friends who valued social activities and their educational outcomes.

The findings summarized above were based on data from the National Education Longitudinal Study of 1988 (NELS:88), a general-purpose, federally funded study of the educational progress of American children (Ingels, Scott, Lindmark, Frankel, and Myers 1992). Initiated in 1988, this national study surveyed 8th-grade students in middle schools. Two years later, in 1990, most of these students were resurveyed as part of the first follow-up. This survey further augmented the student sample to add a freshening sample of 10th-graders in order to obtain a representative sample of students enrolled in the 10th grade in 1990. Most of these same individuals were resurveyed in 1992 when they were 12th-graders, dropouts, or early graduates, and again in 1994 when many had entered the work force or postsecondary institutions. Since a major purpose of this study was to explore the relationship between peer association in high school and educational outcomes measured during and after high school, it used all 10th-graders who were enrolled in school during the first follow-up survey (1990) as the base sample, and then selected, among them, those who also participated in the 1992 and 1994 follow-up surveys (including those who dropped out of school between the 1990 and 1992 follow-ups). Thus, the sample used in this study can be referred to as the "10th grade to third follow-up (1994) panel sample." The appendix presents detailed information on how the sample was selected and on the variables used in the analysis.

Students' Peer Groups in High School

What kinds of friends do high school students have? Are their friends interested in learning and studying and in participating in social activities? Do they belong to a group that likes to indulge in risk-taking activities? Do their patterns of peer association change over the course of their enrollment in high school? These questions can be addressed by a series of questions appearing in the first and second follow-up surveys of NELS:88, in which students were asked to report on the importance they felt their friends placed on various activities or goals. Their responses are presented in figure 1.

Figure 1.—Percentage of students reporting that their friends consider it very important to do the following things: 1990 and 1992



SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, First and Second Follow-Up Surveys.

As the survey results show, most high school students had friends who cared about school learning and achievement. For example, in 1990, a majority of high school sophomores (81 percent) reported that their friends considered finishing high school very important. While about one-third of them (36 percent) thought that their friends valued studying, half or more reported that their friends placed high priority on attending class (58 percent), getting good grades (51 percent), and continuing education after high school (53 percent). Although this general pattern remained fairly stable after two years when most of these students were seniors, there were some differences. As seniors, these students perceived their friends as placing somewhat less emphasis on class attendance and good grades, but more on higher education than they did two years previously when they were sophomores.[4]

While the majority of high school students reported having friends who cared about learning, some of them also said they had friends who were highly interested in social activities. In 1990, more than one-third (36 percent) of high school sophomores said that their friends considered it very important to be popular with their peers. About one-fourth of the sophomores also described their friends as being very interested in playing sports (29 percent) and having a steady boyfriend or girlfriend (22 percent). These proportions, however, declined after two years, when the majority of the sophomores were seniors. In the senior year, for example, one-fifth of these students (21 percent) described their friends as being interested in playing sports, one-fourth of them (28 percent) thought that their friends were very interested in being popular with their peers, and less than one-sixth of them (16 percent) said their friends considered having a boyfriend or girlfriend very important.

In 1992, a small proportion of sample members reported that they had friends who considered having sex, using drugs, and drinking very important. As shown in figure 1, one in every five sample members (21 percent) thought that having sex was very important to his or her friends. About 10 percent thought that their friends considered drinking very important and 3 percent responded that using drugs was very important to their friends. The influence of these friends on an adolescent's school learning would be an important topic for researchers to pursue in the future.

Peer Groups According to Students' Demographic and Academic Characteristics

Do male and female students differ in their choice of friends in high school? Do students from different social and racial–ethnic backgrounds have different kinds of friends? Do academically oriented students associate with like-minded peers? The following analyses address these questions. To simplify the analyses, factor analysis was first conducted on the items shown in figure 1 separately for both the 1990 and 1992 data (see the technical appendix of this report for the actual factor loadings). A series of bivariate analyses were then performed to compare students from different demographic and academic backgrounds in terms of their peer association.

Peer groups. Three factors emerged from this factor analysis, each corresponding to a distinctive value students perceived their friends to have (table 1). The first factor, seen in both the 1990 and 1992 data, consisted of the items relating to the degree of importance students' friends placed on school learning. The second factor, also

Table 1.—Peer groups identified by NELS follow-up data in 1990 and 1992

Factor	Students' friends emphasizing
I	**School learning and achievement (in 1990 and 1992 data)**
	Attending class regularly
	Studying
	Getting good grades
	Finishing high school
	Continuing education after high school
II	**Social activities (in 1990 and 1992 data)**
	Playing sports
	Being popular with students
	Having a steady boy/girlfriend
III	**Engaging in delinquent activities (only in 1992 data)**
	Having sexual relations
	Using drugs
	Drinking

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, First and Second Follow-Up Surveys.

seen in both surveys, consisted of items that described the degree of importance students' friends placed on social activities. The third factor, based only on 1992 data, included items that measured the extent to which students' friends placed importance on engaging in delinquent behaviors. Each factor described the kinds of friends students had in high school—i.e., learning-oriented peers, socially active peers, and those oriented toward delinquent activities. All three factors were continuous standardized variables, with a mean of 0 and standard deviation of 1 on the sample used in the study. When a student had a higher score on a particular factor (e.g., factor I), this indicates that his or her friends valued more these things summarized by this factor (e.g., school learning). Students could also have friends that valued more than one factor (e.g., socializing and academics).

Male versus female students. Male and female students differed with respect to the value orientations of their friends. As shown in table 2, in 1990, male students were more likely than their female counterparts to have friends who took school learning seriously (i.e., the factor mean for females is 0.16, larger than that of -0.12 for males). Males, on the other hand, were more likely than females to associate with peers who placed emphasis on social activities. Two years later (1992), these gender differences changed little.

Male and female students also differed in the extent to which they associated with another type of friend—i.e., one who valued engaging in delinquent behaviors. Based on the 1992 data, male students were more likely than female students to report that they had friends who considered it important to engage in delinquent behaviors.[5]

Table 2.—Importance that students' friends place on school learning, social activities, and engaging in delinquent behaviors, by student demographic and academic characteristics: 1990 and 1992

Student characteristics[1]	Students' friends emphasize: School learning[2] in 1990	Social activities[2] in 1990	School learning[2] in 1992	Social activities[2] in 1992	Delinquent behavior[2] in 1992
I. Demographic characteristics					
Gender					
Male (reference group)	-0.12	0.18	-0.18	0.14	0.26
Female	0.16***	-0.18***	0.18***	-0.17***	-0.24***
Race—ethnicity					
White (reference group)	-0.02	0.01	-0.02	-0.02	0.04
Asian/Pacific Islander	0.26***	-0.06	0.21***	-0.07	-0.20***
Hispanic	-0.01	-0.15**	0.02	-0.06	-0.05
Black	0.24***	-0.05	0.10	0.05	-0.16***
American Indian/Alaskan Native	0.09	0.21	0.03	-0.02	-0.09
Socioeconomic status (SES)					
Low SES (reference group)	-0.07	-0.07	-0.10	-0.04	-0.05
Middle SES	-0.03	0.01	-0.02	0.01	0.02
High SES	0.17***	0.05 *	0.12***	-0.06	0.01
II. Academic characteristics					
Educational expectations					
High school or less (reference group)	-0.73	0.03	-0.47	0.04	0.25
Some postsecondary education	-0.23***	-0.04	-0.22**	-0.02	0.16
4-year college graduation	0.06***	0.01	0.04***	-0.01	0.01**
Postcollege education	0.29***	0.03	0.22***	-0.05	-0.21***
GPA from 9th to 10th grade					
D average (reference group)	-0.51	-0.01	-0.34	-0.03	0.13
C average	-0.21***	-0.09	-0.17**	-0.04	0.11
B average	0.13***	0.01	0.10***	0.01	-0.05**
A average	0.30***	0.03	0.20***	-0.03	-0.10***
Ever held back since 1st grade					
Yes (reference group)	-0.10	0.00	-0.14	0.10	0.12
No	0.04**	-0.01	0.03***	-0.05**	-0.02***

NOTE: Column 2, row 10 reads. High SES students scored 0.17 standard deviations above the mean in their attitudes about school learning, compare with low SES students who scored 0.07 standard deviation units below the mean. This difference was signficant at the p≤0.001 level.

[1] *T* tests were conducted between each subgroup and the reference group, using the Bonferroni adjustment. *P ≤ 0.05; **P ≤ 0.01; ***P ≤ 0.001.

[2] These variables were constructed using principal components factor analysis. The numbers under the column headings are the means of the subgroups.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, First and Second Follow-Up Surveys.

Minority versus white students. In both 1990 and 1992, Asian/Pacific Islander students were more likely than white students to report having learning-oriented friends. On the other hand, Asian/Pacific Islander students were less likely than their white peers to have friends who were interested in sex, drugs, and drinking. This finding is consistent with a recent study conducted by researchers from Stanford University and the University of Wisconsin that found that Asian-American students tend to form academically focused groups that study together, encourage each other, and strive for high grades (Leslie 1996).

Contrary to past research that has hypothesized a "disidentification" with academic achievement among black students (Steele 1992), 10th-grade black students in 1990 were more likely than white students to describe their friends as being academically minded (i.e., the factor mean for black students is 0.24, compared to -0.02 for whites). This difference, however, was not apparent after two years (1992).[6] Black students in 1992 were less likely than their white counterparts to describe their friends as being interested in engaging in delinquent behaviors.[7] Previous studies indicated that black students tend to disdain academic accomplishment, sometimes dismissing it as "acting white" (Ogbu 1985). Whether this explains the change observed here needs further investigation, however.

In both the 1990 and 1992 surveys, no differences were found between Hispanic or American Indian/Alaskan Native students and their white counterparts in the extent to which they associated with learning-oriented friends. While Hispanic 10th-graders were less likely than white students to have friends who emphasized social activities, no other differences were found between minorities and whites in the association with such friends.

Students from different socioeconomic backgrounds. Students from high-SES families were more likely than low-SES students to have friends who emphasized school learning and achievement. This pattern appeared to be quite stable throughout the high school years and is consistent with previous findings by Coleman (1961) and Hollingshead (1949). Interestingly, students with different SES backgrounds did not differ significantly in terms of their association with peers who emphasized social activities or engaging in delinquent behaviors.

Students from different academic backgrounds. There is reason to believe that students who care about learning are more likely to associate with peers who share this interest than those who have less interest in learning. This belief is supported by the data shown in the lower panel of table 2, where three measures of academic background were examined: (1) educational expectations in the 10th grade; (2) average GPA in reading, mathematics, science, and social studies from the 9th to 10th grades; and (3) whether a student had ever repeated a grade since the first grade.

As expected, students who had higher educational expectations, obtained a higher GPA, and had never repeated a grade were more likely to have learning-oriented friends throughout high school years than those who had lower expectations, had a lower GPA, or had been retained in a grade. Differences were especially large between students who expected to pursue college or graduate education and those who expected only high school graduation and between students who

had an A average and those who had a D average.

Academically strong students were less likely than their academically weak counterparts to have friends who valued delinquent behaviors. However, few differences existed in terms of students' association with peers who were interested in social activities. This suggests that while students with different academic backgrounds distinctively chose friends who cared about (or did not care about) learning, or who thought engaging (or not engaging) in delinquent behaviors important, they equally liked (or did not like) to have friends who were fond of social activities.

How Does Students' Peer Association Relate to Their Educational Outcomes?

What are the educational outcomes for students who associate with learning-oriented friends, "socially active" peers, or peers who think having sex, using drugs, and drinking are very important? Table 3 presents an answer to this question. Six educational outcomes were examined in this investigation: (1) reading proficiency level in the 12th grade; (2) math proficiency level in the 12th grade; (3) dropping out of school at least once between 9th and 12th grade; (4) enrollment in an academic program in high school; (5) high school graduation status in 1994; and (6) postsecondary education attendance in 1994. Since students' gender, race–ethnicity, and SES were related to the kinds of friends they chose (see table 2), and it is also well known that these demographic characteristics are correlated with the set of educational outcomes examined here, these relationships were investigated after adjusting for these student characteristics.[8] For reading and mathematics proficiency level in 12th grade, a composite score of 10th-grade achievement in reading, mathematics, science, and social studies was also included for additional adjustment.[9]

As shown in table 3, while students' association with "socially active" peers seemed to be unrelated to their educational outcomes, their association with "learning-oriented" or "delinquent-type" peers did relate to their success in school. For example, compared with students with friends who showed a relatively low level of interest in learning, those with friends who cared most about school learning were less likely to drop out of school, and more likely to be enrolled in an academic program, to reach an advanced level of reading and math proficiency during their last year of high school, to graduate from high school, and to continue their education after high school.

Students with friends who placed importance on pursuing sex, drugs, and drinking differed markedly in terms of their educational performance. For instance, students' association with more such friends was related to a higher rate of dropping out of school, a lower rate of being enrolled in an academic program in high school, graduating from high school, and continuing their education after high school. It should be noted that all of these relationships were estimated after controlling for students' SES, race–ethnicity, and gender, and that for reading and mathematics proficiency, the estimation also controlled for 10th-grade achievement.

Table 3.—Students' educational outcomes according to the characteristics of students' friends (1990 and 1992), adjusted by students' SES, gender, and race–ethnicity:

Students' friends emphasize[1]	Reading proficiency in 1992[2] % At advanced level	Math proficiency in 1992[2] % At advanced level	Ever dropped out of high school[3] % Yes	Track placement in high school[3] % In academic program	High school graduation status in 1994[3] % Obtained HS diploma or GED	PSE attendance before or during 1994[3] % Yes
1990 Data						
School learning[4]						
Low level (reference group)	23.2	32.4	19.5	59.3	90.7	60.0
Medium level	23.8	36.1*	11.7***	69.4***	93.8*	71.3***
High level	24.6	37.5**	11.8***	71.6***	94.2***	77.1***
Social activities[4]						
Low level (reference group)	22.9	34.8	12.8	67.3	93.4	69.3
Medium level	23.0	36.3	12.3	68.8	93.4	72.2
High level	25.3*	35.3	15.8	66.3	92.9	67.8
1992 Data						
School learning[4]						
Low level (reference group)	22.9	33.0	20.0	61.6	90.0	62.9
Medium level	23.2	36.5 *	11.0***	69.6***	94.4***	72.0***
High level	26.4*	37.5**	8.7***	73.6***	95.6***	77.1***
Social activities[4]						
Low level (reference group)	23.1	34.7	15.5	66.1	91.6	71.1
Medium level	24.0	36.6	12.8	69.3	93.2	70.3
High level	24.5	34.8	12.7	66.3	94.8	69.5
Engaging in delinquent activities[4]						
Low level	25.0*	37.5***	10.1***	71.6***	94.4*	75.2***
Medium level	23.8	35.9	14.2	67.7**	93.5	69.3 *
High level (reference group)	22.6	32.7	16.3	62.7	91.5	65.7

[1]*T* tests were performed between each subgroup and the reference group, using the Bonferroni adjustment. *P ≤ 0.05; **P ≤ 0.01; ***P ≤ 0.001.

[2]The analysis was controlled for SES, gender, race–ethnicity, and 10th-grade academic achievement.

[3]The analysis was controlled for SES, gender, and race–ethnicity.

[4]The factor was divided into three levels: 1) the low level included all values of the factor that are lower than the 25th percentile; 2) the high level included all values of the factor that are higher than the 75th percentile; and 3) all remaining nonmissing values were grouped into the medium level.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, First, Second, and Third Follow-Up Surveys.

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Summary and Implication for Future Research

The results presented in this report suggested that high school students differed significantly in their choice of friends. Some students had friends who were concerned with school learning and achievement. Some had friends who valued dating, playing sports, or being popular with their peers. A smaller proportion liked to associate with those who were interested in having sex, using drugs, and drinking. The results presented in this report further demonstrated that the kinds of friends students had in high school were related to a wide range of important educational outcomes, after holding constant important demographic characteristics and previous academic achievement. Although it remains unclear at this point whether peer association had a causal and independent influence on students' learning, the results of this study clearly suggested that students who had more "learning-oriented" friends tended to perform better in school than other students over the course of their schooling, and students who spent time with those interested in delinquent activities were less likely to experience success in school.

Based upon these results, future research may pursue: (1) identifying factors related to students' choice of friends; (2) incorporating school characteristics to explore whether students attending different types of schools associate with different kinds of peers; and (3) investigating the effect of peer associations on students' learning and other important educational indicators, such as course-taking behavior or dropping out of school.

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Notes

1. The author would like to thank Phillip Kaufman for his feedback, Jeffrey Owings and Peggy Quinn for their constructive suggestions, and Andrea Livingston and Karyn Madden for their careful editing of this brief.

2. The theoretical importance of peer influences on educational outcomes has a long history going back to Coleman et al's *the Equality of Educational Opportunity* (pp. 319–325, 1966). For an early overview of this history see Joyce Epstein and Karweit, *Friends in School:*

Patterns of Selection and Influence in Secondary Schools (1983).

3. These variables are based on the students' perception of their friends' values. Their friends were not asked about their own values.

4. These changes are in the average characteristics of friends described by students rather than changes in the characteristics of individual students' friends. The statistical significance of these differences were assessed with a paired t-test.

5. This difference {0.26-(-0.24)=0.50}, which is half a standard deviation, should be considered quite large.

6. When the individual items that formed this factor were examined, it was found that from 1990 to 1992, black students had increasingly fewer friends who valued class attendance, study, good grades, high school graduation, and postsecondary education, whereas white students had increasingly more friends who thought that high school graduation and postsecondary education were very important.

7. In examining individual items that formed this factor, it was found that black students were less likely than white students to have friends who placed great importance on drinking. However, both groups were equally likely to associate with friends who valued having sex and using drugs.

8. The adjustment procedure here was developed by Dennis Carroll of the NCES, Longitudinal Studies Branch. As an example of this technique, look at reading proficiency. Of all students selected in the study, the proportion achieving high reading proficiency is 24.2 percent. A crosstab was then run to get the percent of high reading proficiency for a particular student group, based on a combination of SES (3 levels), sex (2 levels), race (5 levels), and previous academic achievement (4 levels)—e.g. male, black, high-SES, and high previous achievement. This yielded a result of 18.2 percent. There are a total of 3x2x5x4=120 combinations (groups or percentages). Each student has a variable Y representing whether or not he or she reached a high proficiency level, and this Y has three possible values: missing, 0 (No), and 1(Yes). A new variable (Z) was then constructed from Y to reflect an adjustment of Y by SES, race, sex, and previous achievement as follows: if Y=missing then Z=missing; otherwise, if a student belonging to a particular group, e.g., male, black, high SES, and high previous achievement, then Z=Y+24.2%-18.2%. So on and so forth. After all those computations, each student had a value on Z, which removed all the variation attributable to ses, race, sex, and previous achievement. Then the computer program SUDAAN was used to run a *t*-test to determine whether students who associated with different kinds of friends differed in the mean on Z. This procedure was applied to all outcome variables—high math proficiency, dropping out, tracking placement, HS graduation, and PSE attendance.

9. This measure was taken from the 1990 standardized test quartile (F12XQURT), which combined 10th-graders' achievement test scores in reading, mathematics, science, and social studies.

Appendix

Overview of NELS:88. NELS:88 is a general-purpose, federally funded study that tracks the educational progress of American children from their completion of middle school through high school and into postsecondary education or the work force (Ingels, Scott, Lindmark, Frankel, and Myers 1992). The base-year study, which was initiated in 1988, surveyed 8th-grade students enrolled in middle schools and collected comprehensive data from students, families, teachers, and schools.

The first follow-up of NELS:88 was conducted in 1990, when the majority of the base-year 8th-grade cohort entered the 10th grade. To obtain a representative sample of students enrolled in the 10th grade in 1990, the survey augmented the student sample through a process called "freshening." In the first follow-up, those who dropped out between the 8th and 10th grade were identified and surveyed, and data from students (or dropouts), teachers, and schools were collected.

The second follow-up of NELS:88 took place in 1992, when most of the sample members entered their senior year of high school. Again, like the first follow-up, the second follow-up "freshened" the student sample to provide a representative sample of 12th-graders in 1992. Students who were identified as dropouts or early graduates were also followed and resurveyed. This second follow-up enabled researchers to measure the culmination of students' learning experiences in high school.

The third follow-up of NELS:88 was conducted in 1994, when most of the sample members had already completed high school and had entered the work force or postsecondary institutions. This follow-up was designed to address issues of employment and postsecondary access.

Questions That Students Were Asked About Their Friends in NELS:88. In the first and second follow-ups of NELS:88, students were asked to report on how their close friends felt about doing various things related to their experiences inside and outside of school. It was their answers to these questions that formed the core of this analysis. The questions are worded as follows: *Among the friends you hang out with, how important is it to. . .*

In the first follow-up survey of 1990:

F1S70A—Attend class regularly
F1S70B—Study
F1S70C—Play sports
F1S70D—Get good grades
F1S70E—Be popular with students
F1S70F—Finish high school
F1S70G—Have a steady boy/girlfriend
F1S70H—Be willing to party, get wild
F1S70I—Continue education past HS
F1S70J—Participate in religious activity
F1S70K—Do community work / volunteer
F1S70L—Have a steady job

In the second follow-up survey of 1992:

F2S68A—Attend class regularly
F2S68B—Study
F2S68C—Play sports
F2S68D—Get good grades
F2S68E—Be popular with students
F2S68F—Finish high school
F2S68G—Have a steady boy/girlfriend
F2S68H—Continue education past HS
F2S68I—Participate in religious activities
F2S68J—Do community work/volunteer
F2S68K—Have a steady job
F2S68L—Get together with friends

F2S68M—Go to parties
F2S68N—Have sexual relations
F2S68O—Use drugs
F2S68P—Drink
F2S68Q—Make money

Only the items highlighted in bold were selected for the analysis in this study, because they appear in both surveys, allowing investigation of the possible change in students' peer association between 10th and 12th grade and they form substantively meaningful factors in the factor analysis. Items about friends' attitudes toward sex, drugs, and drinking appeared only in the second follow-up survey; however, because they are substantively important and interesting, they were included in the analysis. Excluded items were those relating to friends' attitudes toward religious activities, community service, money, jobs, and party attendance.

Sample Used in the Analysis. This study was designed to examine peer groups in high school and to explore the relationship between students' peer association and their educational outcomes both during and after high school. To this end, the analysis used all 10th-graders who were enrolled in school at the time of the first follow-up survey as the base sample, and selected, among them, those who participated in the 1992 and 1994 follow-up surveys. This sample, therefore, can be described as the "10th grade to third follow-up (1994) panel sample." In order to examine how students' peer groups changed from the 10th to 12th grade, the analysis further selected, among this panel sample, those students who completed the survey items highlighted in bold above. A total of 11,036 sample members met these selection criteria, and these students were selected for the analysis. The resulting unweighted sample sizes after each sample selection are summarized as follows: (1) selecting the 10th grade to the third follow-up panel sample resulted in 12,833 students; and (2) within this sample, selecting those who completed data on the highlighted survey items resulted in a total of 11,036 students (1,797 students were excluded).

When the selected (N=11,036) and excluded students (N=1,797) were compared, it was found that the excluded students were more likely than the selected students to come from lower SES families; to be Hispanic, black, and high school dropouts; and to have lower educational expectations, GPA, and achievement levels. Because of these differences, the retained sample underrepresents disadvantaged students.

Variables Used in the Analysis

Characteristics of Students' Peer Groups

Friends' Emphasis on School Learning Factor in 1990—This measure is the standardized factor score (mean=0 and standard deviation=1) constructed by a principal components factor analysis. It combines students' reports in 1990 on how important their friends consider the following: (1) attend class regularly (F1S70A; factor loading=0.82); (2) study (F1S70B; factor loading=0.80); (3) get good grades (F1S70D; factor loading=0.79); (4) finish high school (F1S70F; factor loading=0.74); and (5) continue education past high school (F1S70I; factor loading=0.77). The codings for the five variables are as follows: 1=Not important; 2=Somewhat important; and 3=Very important. The factor has an eigenvalue of 3.10 and accounts for 61.9 percent of the variance in these five variables. Cronbach's alpha of the reliability is 0.84.

Friends' Emphasis on Social Activities in 1990—This measure is the standardized factor score (mean=0 and standard deviation=1) constructed by a principal components factor analysis. It combines students' reports in 1990 on how important their friends consider the following: (1) play sports (F1S70C; factor loading=0.43); (2) be popular with students (F1S70E; factor loading=0.50); and (3) have a steady boy/girlfriend (F1S70G; factor loading=0.43). The codings for the three variables are as follows: 1=Not important; 2=Somewhat important; and 3=Very important. The factor has an eigenvalue of 1.61 and accounts for 53.8 percent of the variance in these four variables. Cronbach's alpha of the reliability is 0.56.

Friends' Emphasis on School Learning and Achievement Factor in 1992—This measure is the standardized factor score (mean=0 and standard deviation=1) constructed by a principal components factor analysis. It combines the reports of students who were asked again in 1992 how important their friends consider the following: (1) attend class regularly (F2S68A; factor loading=0.81); (2) study (F2S68B; factor loading=0.82); (3) get good grades (F2S68D; factor loading=0.83); (4) finish high school (F2S68F; factor loading=0.73); and (5) continue education past high school (F2S68I; factor loading-0.76). The codings for the five variables are as follows: 1=Not important; 2=Somewhat important; and 3=Very important. The factor has an eigenvalue of 3.16 and accounts for 63.1 percent of the variance in these five variables. Cronbach's alpha of the reliability is 0.85.

Friends' Emphasis on Social Activities in 1992—This measure is the standardized factor score (mean=0 and standard deviation=1) constructed by a principal components factor analysis. It combines the reports of students who were asked again in 1992 how important their friends consider the following: (1) play sports (F2S68C; factor loading=0.50); (2) be popular with students (F2S68E; factor loading=0.67); and (3) have a steady boy/girlfriend (F2S68G; factor loading=0.46). The codings for the three variables are as follows: 1=Not important; 2=Somewhat important; and 3=Very important. The factor has an eigenvalue of 1.63 and accounts for 54.4 percent of the variance in these four variables. Cronbach's alpha of the reliability is 0.57.

Friends' Emphasis on Engaging in Delinquent Behavior in 1992—This measure is the standardized factor score (mean=0 and standard deviation=1) constructed by a principal components factor analysis. It combines the report of students in 1992 on how important their friends consider the following: (1) have sexual relations (F2S68N; factor loading=0.77); (2) use drugs (F2S68O; factor loading=0.76); and (3) drink (F2S68P; factor loading=0.86). The codings for the three variables are as follows: 1=Not important; 2=Somewhat important; and 3=Very important. The factor has an eigenvalue of 1.92 and accounts for 64.0 percent of the variance in these three variables. Cronbach's alpha of the reliability is 0.70.

Characteristics of Students

Sex—F1SEX, 1=Male and 2=Female.

Race–Ethnicity—F1RACE, recoded so that 1=Asian/Pacific Islander, 2=Hispanic, 3=black, 4=American Indian/Alaskan Native, and 5=white.

Socioeconomic Status—F1SES, recoded into three levels so that 1= Low SES, including all values lower than the 25th percentile; 2=Middle SES, including all nonmissing remaining values; and 3=High SES, consisting of all values higher than the 75th percentile.

Educational Expectations—This measure is the 10th-grader's report on the level of education he or she expects to obtain (F1S49). The original codings of this variable were recoded into the following: 1=Less than high school or high school graduation only; 2=Some postsecondary education; 3=4-year college graduation; and 4=Postcollege education.

GPA from 9th to 10th Grade—This measure was created by (1) averaging the GPA reported by the 10th grader in reading (F1S39A), mathematics (F1S39B), science (F1S39C), and social studies (F1S39D) from 9th to 10th grade; and (2) recoding into four groups: Average A includes all values from 3.50 to the highest; average B includes all values between 2.50 to 3.49; average C includes all values from 1.50 to 2.49; average D includes the values of 1.49 or below.

Ever Held Back a Grade—This measure was constructed from the variable of F1N22 (in 1990) and F2N16 (in 1992), both of which asked a student whether he or she was ever held back a grade. The measure takes 1=Yes, if a student said "Yes" to either F1N22 or F2N16 or both, and 0=No, if a student responded "No" to both F1N22 and F2N16.

Previous Academic Achievement Control—This measure was taken from the 1990 standardized test quartile (F12XQURT), which combined 10th-graders' achievement test scores in reading, mathematics, science, and social studies.

Educational Outcomes

Reading Proficiency Level at the 12th Grade—F22XRPRO, 1=Advanced level, defined as the ability to make complex inferences or evaluation that require piecing together multiple sources of information from the passage; and 2=Below the advanced level.

Math Proficiency Level at the 12th Grade—F22XMPRO, 1=Advanced level, defined as the ability to understand intermediate-level mathematical concepts, to formulate multi-step solutions to word problems, to solve complex multi-step word problems, and to demonstrate knowledge of mathematics material found in advanced mathematics courses; and 2=Below the advanced level.

Ever Dropped out of High School between 9th and 12th Grade—F2EVDOST, 1=Dropped out at least once between 9th and 12th grade; and 2=Never dropped out.

Track Placement in High School—F3HSPROG, 1=Academic program, and 2=Others.

High School Graduation Status—F3DIPLOM, 1=Obtained high school diploma or GED by 1994; and 2=No.

Postsecondary Education Attendance—F3PSENUM, 1=Attended (or attending) a postsecondary institution by 1994 (or in 1994); and 2=No.

Statistical Procedures. Given the descriptive nature of this report, simple methods, such as *t* tests, were used. Since this investigation employed the 10th grade to third follow-up panel sample, the corresponding panel weights (F3F1PNWT) were used in the analysis (except for factor

analysis, the purpose of which is to construct variables). Comparisons were made between subgroups (e.g., Asian/Pacific Islander, Hispanic, and so on) and the reference group (e.g., white) and the contrasts were tested by the *t* statistic to ensure that the differences between groups are larger than that might be expected due to sampling variation. Since NELS:88 used a multi-stage stratified cluster sampling design, all contrasts were performed with the SUDAAN software, which uses a Taylor series approximation to adjust the effects of a complex sampling design and generates adjusted standard errors. Standard errors for the variables used in this report are presented in tables 4 and 5. Multiple contrasts were also adjusted using the Bonferroni procedure which corrects the significance level by dividing the alpha level by the total number of comparisons possible with a particular classification variable.

Table 4.—Standard errors for the importance students' friends place on school learning, social activities, and engaging in delinquent behaviors, by student demographic and academic backgrounds: 1990 and 1992

Student characteristics	School learning in 1990	Social activities in 1990	School learning in 1992	Social activities in 1992	Delinquent behavior in 1992
Total	0.01	0.01	0.01	0.01	0.01
Gender					
Male	0.02	0.02	0.02	0.02	0.02
Female	0.02	0.02	0.02	0.02	0.02
Race–ethnicity					
Asian/Pacific Islander	0.05	0.06	0.05	0.06	0.06
Hispanic	0.04	0.05	0.04	0.04	0.04
Black	0.04	0.05	0.05	0.05	0.05
American Indian/Alaskan Native	0.16	0.20	0.08	0.08	0.11
White	0.02	0.02	0.02	0.02	0.02
Socioeconomic status (SES)					
Low SES	0.03	0.03	0.03	0.03	0.03
Middle SES	0.02	0.02	0.02	0.02	0.02
High SES	0.03	0.03	0.03	0.03	0.03
Educational expectations					
<HS/HS only	0.06	0.05	0.05	0.04	0.04
Some postsecondary education	0.02	0.03	0.02	0.02	0.03
4-year college graduation	0.02	0.02	0.02	0.02	0.02
Postcollege education	0.03	0.03	0.03	0.03	0.03
GPA from 9th to 10th grade					
D average	0.08	0.07	0.09	0.07	0.07
C average	0.03	0.03	0.03	0.03	0.03
B average	0.02	0.02	0.02	0.02	0.02
A average	0.02	0.03	0.02	0.03	0.03
Ever held back since 1st grade					
Yes	0.04	0.04	0.04	0.04	0.04
No	0.02	0.02	0.01	0.01	0.02

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, First and Second Follow-Up Surveys.

Table 5.—Standard errors for educational outcomes according to the characteristics of students' friends

	Reading proficiency in 1992	Math proficiency in 1992	Ever dropped out of high school	Track placement in high school	High school graduation status in 1994	PSE attendance before or during 1994
	% At advanced level	% At advanced level	% Yes	% In academic program	% Obtained HS diploma or GED	% Yes
Total	0.70	0.91	0.56	0.83	0.43	0.72
Friends' emphasis on school learning in 1990						
Low level	1.22	1.12	1.23	1.44	0.79	1.39
Medium level	0.93	1.10	0.64	1.00	0.51	0.88
High level	1.47	1.86	1.36	1.57	1.09	1.20
Friends' emphasis on social activities in 1990						
Low level	1.07	1.61	1.01	1.38	0.65	1.29
Medium level	1.08	1.23	0.77	1.11	0.68	0.92
High level	1.23	1.44	1.11	1.37	0.79	1.26
Friends' emphasis on school learning in 1992						
Low level	1.13	1.33	1.21	1.36	0.97	1.29
Medium level	0.93	1.25	0.76	1.08	0.54	1.00
High level	1.54	1.66	0.74	1.34	0.61	1.16
Friends' emphasis on social activities in 1992						
Low level	1.20	1.56	1.34	1.61	1.14	1.29
Medium level	1.02	1.24	0.70	1.03	0.51	0.93
High level	1.36	1.56	0.98	1.34	0.74	1.22
Friends' emphasis on delinquent behavior in 1992						
Low level	1.22	1.39	0.99	1.26	0.93	1.06
Medium level	1.02	1.31	0.81	1.14	0.62	1.07
High level	1.35	1.77	1.09	1.48	0.71	1.29

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, First, Second, and Third Follow-Up Surveys.